

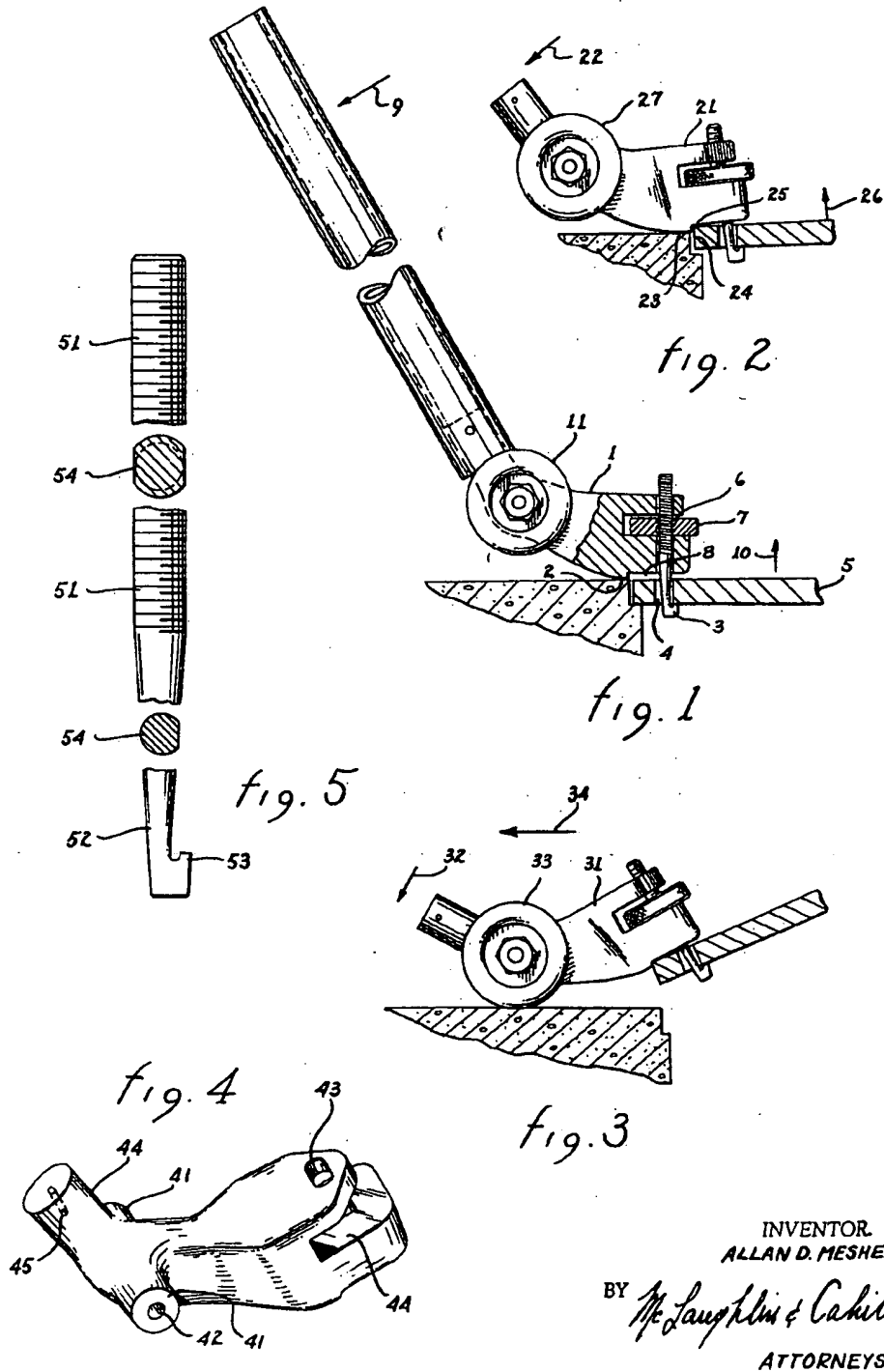
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MANHOLE COVER HANDLING DEVICE

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## MANHOLE COVER HANDLING DEVICE

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This invention relates to a device for handling a manhole cover, in particular to a device for disengaging a manhole cover from its seated position, lifting the cover and trundling it to another location.

The handling of manhole covers is a particularly strenuous and often times even dangerous operation because of their weight and rather awkward dimensions. Generally it is a two or three-man operation which is carried out by sheer muscle power without devices offering any substantial mechanical advantage. It would be highly advantageous to provide a device for handling a manhole cover which, through the provision of mechanical advantage, would permit the disengaging, lifting and trundling of the cover by a single man and with increased safety and expedition.

Accordingly, it is an object of the present invention to provide a device for disengaging a manhole cover from its seated position;

A further object of the invention is to provide a device for lifting a manhole cover;

A still further object of the invention is the provision of a device for trundling a manhole cover to another location;

Yet another object of the invention is the provision of a device for accomplishing the afore-stated objectives which can be operated by one man;

Yet another object of the invention is the provision of such a device whereby such operation can be accomplished with increased safety;

Other objects of the invention will become apparent from the following detailed description thereof taken in connection with the drawings in which;

FIG. 1 is a side view of the device disclosed in the cover-disengaging position;

FIG. 2 is a side view of the device positioned in its cover-lifting position;

FIG. 3 is a side view of the device in its cover-trundling position;

FIG. 4 is a perspective view of the frame portion of the device; and

FIG. 5 is a combination sectional and side view of the cover latching stud.

The afore-stated objectives of the invention are accomplished in a device comprising an elongate frame having a front end and a rear end and shaped to provide a ground-contacting fulcrum point therebetween, a cover latch assembly carried on the front end of the frame comprising a downwardly depending latch stud, and a wheel assembly carried on the rear of the frame and positioned such that when the cover latch is in the cover-disengaging position the wheels are spaced from the ground. A full understanding of the invention will be facilitated by reference to the drawings and the accompanying detailed description.

In the device chosen for illustration in the drawings, in FIG. 1, the device is shown in the cover-disengaging position wherein the frame 1 contacts the ground in the vicinity of the manhole cover at the fulcrum point 2 and the latch stud 3 is inserted through a hole 4 in the edge area of the manhole cover 5 and, as shown, has a forward integral projection which latches under the lower surface of the manhole cover. To facilitate the insertion of the latch stud through the hole in the manhole cover, the proper positioning of the device in the cover disen-

gaging position or the use of the device in handling manhole covers of varying thicknesses, the latch stud is advantageously but not necessarily provided with a threaded shank 6 which is received in the front end of the frame, the threaded shank being operatively associated with an adjusting nut 7 carried in the frame which is used to raise and lower the latch stud relative to the frame. For the most advantageous operation the latch stud should extend downwardly from the frame a sufficient distance to latch under the lower surface of the manhole cover and still provide a slight clearance 8 between the top of the cover and the bottom of the frame such that when the frame is rocked around the fulcrum point in response to a force exerted in the direction shown in the arrow 9, the initial movement of the edge of the cover is in a substantially vertical direction as indicated by the arrow 10. This first movement of the cover merely disengages the cover from its formerly seated position. It will be noted that when the device is positioned as shown in FIGURE 1 in the cover-disengaging position, the wheels are spaced from the ground to provide for the exertion of the maximum lifting force upon the edge of the manhole cover by rocking the frame around the fulcrum point 2.

In FIG. 2 the device of FIG. 1 is shown in the cover-lifting position wherein the frame 21 has been rocked further in the direction shown by the arrow 22 around the fulcrum 23 causing the previously disengaged edge 24 of the manhole cover to be cammed up into engagement with the bottom of the frame at point 25 thus providing a lifting force on the entire manhole cover in the direction of the arrow 26. Note that the wheels 27 are still spaced from the ground when the device is in the cover lifting position, again to provide the maximum lifting force by rocking the frame around the fulcrum 23.

In FIG. 3 the device is shown in the cover trundling position wherein the frame 31 has been further rocked in the direction shown by the arrow 32 until the wheels 33 contact the ground and lift the fulcrum 33 and the front end of the frame which carries the cover latch assembly. In this position the manhole cover is latched securely to the underside of the frame and the device can then be trundled in the direction shown by the arrow 34 by a pulling force on the operating lever handle.

FIG. 4 shows the frame portion of the embodiment of the invention chosen for illustration with the operating lever handle, the wheel assembly and the cover latch assembly removed to show the axle housing 41 provided with a hole 42 to receive the axle (not shown) of the wheel assembly. The axle housing should desirably extend for some distance laterally to each side of the frame in order to provide a wheel spacing wide enough to promote stability when the device is in the cover-trundling position as shown in FIG. 3. The front end of the frame 43 is shaped to receive the latch stud assembly and is provided with a pair of vertically registered holes 43 which are flattened on the front and rear sides thereof to prevent the latch stud from rotating, thus insuring that the latch on the lower end of the latch stud always faces forward in a position to latch under the manhole cover. The nut recess 44 is provided to receive the adjusting nut which raises and lowers the latch stud. The rear end of the frame 44 is shaped to be inserted into a hollow operating lever handle and can be provided with a hole 45 to receive a pin which extends through the handle and the frame to prevent the handle from being disengaged from the frame accidentally.

FIG. 5 is a detailed drawing of the latch stud showing the threaded upper shank portion 51 and the tapered lower portion 52 which terminates in a latch 53. Note that the latch stud is flattened on the front and rear side (as shown in the sectional portions 54). These flattened portions cooperate with the flattened edges of the holes

43 of FIG. 4 to position the latch stud such that the latch 53 always faces to the front, such that it can be inserted through the hole in the manhole cover and latch under and engage the underside of the manhole cover.

By the use of the device chosen for illustration in the drawings or its mechanical equivalent one man can easily disengage a manhole cover from its seated position, lift the cover and trundle it to another location without endangering himself and with a minimum of physical effort. Special utility and advantages are obtained by providing in combination the ground-contacting fulcrum point at a position very close to the edge of the manhole cover whereby when the latch stud is engaged with the manhole cover the first downward movement of the operating lever handle causes the edge of the cover to be lifted substantially vertical to disengage it from its seated position, further downward movement of the handle camming the edge of the cover up into engaging contact with the bottom of the frame, thereby to lift the entire cover while still obtaining the maximum mechanical advantage by continuing to rock the frame around the ground contacting fulcrum point, and, after the entire cover has been lifted from the ground, by providing that the trundling wheels then contact the ground to provide a rolling contact between the ground and the device to facilitate transporting the cover to another location. In this way, once the latch stud is engaged with the manhole cover, the operator need not approach the cover while it is in its lifted position and by one substantially-continuous movement can disengage, lift the cover and transport it to another location.

Many variations of the device chosen for illustration of the drawings will occur to those skilled in the art, and such variations are intended to be included within the scope of the invention which is defined in the following claims.

Having now fully described my invention and the preferred embodiment thereof, I claim:

1. A device for disengaging a manhole cover from its seated position, lifting the cover and trundling it to another location comprising:

- (a) an elongate frame having a front end and a rear end and shaped to provide a ground-contacting fulcrum point therebetween;
- (b) a cover latch assembly carried on the front end of the frame comprising a downwardly depending latch stud, having a forwardly facing cover latch on its lower end, said latch stud being adapted to be inserted through a hole in the edge area of the manhole cover and latch under the lower surface thereof;
- (c) a wheel assembly carried on the rear end of the frame and positioned such that when the cover latch is in the cover disengaging position the wheels are spaced from the ground; and
- (d) an operating lever handle secured to said frame in general alignment with the axis of said wheels extending upwardly rearwardly from the frame,
- (e) whereby in a continuous movement as the operating lever is lowered, the cover is engaged between said latch and frame, is lifted as the frame is rotated about said fulcrum, and is brought to wheel trundling position with the wheels engaging the ground and the fulcrum raised therefrom.

2. A device for disengaging a manhole cover from its seated position, lifting the cover and trundling it to another location comprising:

- (a) an elongate frame having a front end and a rear end and shaped to provide a ground-contacting fulcrum point therebetween;
- (b) a cover latch assembly carried on the front end of the frame comprising a downwardly depending latch stud with a forward projection at its bottom end;
- (c) a wheel assembly carried on the rear end of the

frame and positioned such that when the cover latch is in the cover-disengaging position the wheels are spaced from the ground; and

- (d) an operating lever handle extending upwardly rearwardly from the frame;

downward movement of the handle defining in succession three operative positions of said device, a first position wherein the cover latch stud is inserted into the hole in the cover and the latch stud forward projection engages under said cover, a second position wherein the edge of the cover is cammed up into cover-lifting engagement with the bottom of the frame, and a third position wherein the frame is rocked around the fulcrum to lower the wheels into contact with the ground, thereby enabling the cover to be trundled to another location by pulling on the operating handle.

3. A device for disengaging a manhole cover from its seated position, lifting the cover and trundling it to another location comprising:

- (a) an elongate frame having a front end and a rear end and shaped to provide a ground-contacting fulcrum point therebetween;
- (b) a cover latch assembly carried on the front end of the frame comprising a downwardly depending latch stud, having a forwardly facing cover latch on its lower end, said latch stud being adapted to be inserted through a hole in the edge area of the manhole cover and latch under the lower surface thereof;
- (c) a wheel assembly carried on the rear end of the frame and positioned such that when the cover latch is in the cover disengaging position the wheels are spaced from the ground;
- (d) an operating lever handle extending upwardly rearwardly from the frame, and
- (e) downward movement of the handle defining in succession three operative positions of said device, a first position wherein the cover latch stud is inserted into the hole in the cover and said latch is engaged against a bottom surface of the cover, a second position wherein the edge of the cover is cammed up into cover lifting engagement with the bottom of the frame, and a third position wherein the frame is rocked around the fulcrum to lower the wheels into contact with the ground thereby enabling the cover to be trundled to another location by pulling on the operating handle.

4. A device for disengaging a manhole cover from its seated position, lifting the cover and trundling it to another location comprising:

- (a) an elongate frame having a front end and a rear end and shaped to provide a ground-contacting fulcrum point therebetween;
- (b) a cover latch assembly carried on the front end of the frame comprising a downwardly depending latch stud, a threaded shank extending upwardly therefrom and received in said frame, and a height adjusting nut carried in said frame and operatively associated with said threaded shank to raise and lower the latch stud;
- (c) a wheel assembly carried on the rear end of the frame and positioned such that when the cover latch is in the cover disengaging position the wheels are spaced from the ground;
- (d) an operating lever handle extending upwardly rearwardly from the frame, and
- (e) downward movement of the handle defining in succession three operative positions of said device, a first position wherein the cover latch stud is inserted into the hole in the cover and the nut is turned to raise the latch stud to obtain disengaging clearance between the cover and the frame, a second position wherein the edge of the cover is cammed up into cover lifting engagement with the bottom of the

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frame, and a third position wherein the frame is rocked around the fulcrum to lower the wheels into contact with the ground thereby enabling the cover to be trundled to another location by pulling on the operating handle.

5. A device for disengaging a manhole cover from its seated position, lifting the cover and trundling it to another location comprising:

- (a) an elongate frame having a front end and a rear end and shaped to provide a ground-contacting fulcrum point therebetween;
  - (b) a cover latch assembly carried on the front end of the frame comprising a downwardly depending latch stud with a bottom forwardly facing projection;
  - (c) a wheel assembly carried on the rear end of the frame and positioned such that when the cover latch is in the cover disengaging position the wheels are spaced from the ground; and
  - (d) an operating lever handle extending upwardly rearwardly from the frame; and
  - (e) downward movement of the handle defining in succession three operative positions of said device, a first position wherein the cover latch stud is inserted into the hole in the cover and the latch stud projection is engaged against a bottom surface of the manhole cover, a second position wherein the edge of the cover is cammed up into cover lifting engagement with the bottom of the frame, and a third position wherein the frame is rocked around the fulcrum to lower the wheels into contact with the ground thereby enabling the cover to be trundled to another location by pulling on the operating handle.
6. A device for disengaging a manhole cover from its seated position, lifting the cover and trundling it to another location comprising:
- (a) an elongate frame having a front end and a rear end and shaped to provide a ground-contacting fulcrum point therebetween;
  - (b) a cover latch assembly carried on the front end of the frame comprising a downwardly depending latch stud with a forward projection positioned to engage under a manhole cover when inserted through an opening in said cover;
  - (c) a wheel assembly carried on the rear end of the frame and positioned such that when the cover latch is in the cover disengaging position the wheels are spaced from the ground;
  - (d) a lever projecting upwardly from said frame engaging the frame near said wheels;
  - (e) said fulcrum positioned to cooperate with the latch to lift the cover as the wheels are held away from the ground, and itself to be raised from the ground as the lever is lowered and the said wheels come into ground contact.
7. In a manhole cover lifting and handling device,
- (a) an elongate frame having front and rear ends and a generally rounded bottom capable of acting as a fulcrum,
  - (b) aligned trundling wheels pivotally supported on said frame and raised from the ground when said fulcrum is in contact with the ground,
  - (c) a projection forming a part of the frame facing upwardly and rearwardly thereof,

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- (d) an appending lever engageable with said projection,
  - (e) said frame having a bottom recess forward of said fulcrum to provide clearance between said frame and a manhole cover,
  - (f) a latch member projecting downwardly through said frame and through said forward recess, said latch member having a forward projection engageable against a bottom surface of said cover when latch member is projected through an edge opening in the cover,
  - (g) downward movement of the operating lever functions first to lift one edge of the cover and engage the same between the latch and frame, then to bodily lift the cover, and finally to rotate the frame about the axis of said wheels and lift the fulcrum to permit trundling of the cover to a position away from the manhole.
8. In a manhole cover lifting and handling device,
- (a) an elongate frame having front and rear ends and a generally rounded bottom capable of acting as a fulcrum;
  - (b) aligned trundling wheels pivotally supported on said frame and raised from the ground when said fulcrum is in contact with the ground,
  - (c) a projection forming a part of the frame facing upwardly and rearwardly thereof,
  - (d) an appending lever engageable with said projection,
  - (e) said frame having a bottom recess forward of said fulcrum to provide clearance between said frame and a manhole cover,
  - (f) said frame also having a forward recess intermediate its top and bottom surfaces,
  - (g) a latch member with a threaded shank expending through a vertical opening through said bottom recess and forward recess, said latch member having a forward projection, and
  - (h) an adjusting nut engaging said thread shank and displaced in said forward recess,
  - (i) whereby said latch member may be extended through an edge opening in the cover and the nut turned to engage a bottom surface of a cover,
  - (j) having movement of the lever causing the cover edge to be engaged between the frame and latch projection, to lift the cover, and to raise the fulcrum for trundling all in a series of continuous operations as the lever is lowered.

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